

Regulatory Perspectives on Transportation of Spent Nuclear Fuel



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Discussion Topics

- DOT and NRC Transportation Oversight
- Safety Record
- Transportation Studies
- Security Requirements for Shipments
- NRC Actions Post 9/11
- Conclusions

Role of the U.S. Department of Transportation (DOT)

- **Hazardous materials shipment safety**
- **Hazard communication**
- **Routing**
- **International Coordination**

Role of the U.S. Nuclear Regulatory Commission (NRC)

- Certify casks as accident resistant
 - Comprehensive review
 - Stringent test/analysis requirements
 - Role of quality assurance (QA)
- Inspect:
 - Cask designers,
 - Fabricators,
 - Shippers and shipments
 - QA programs

SPENT FUEL CASK-RAIL

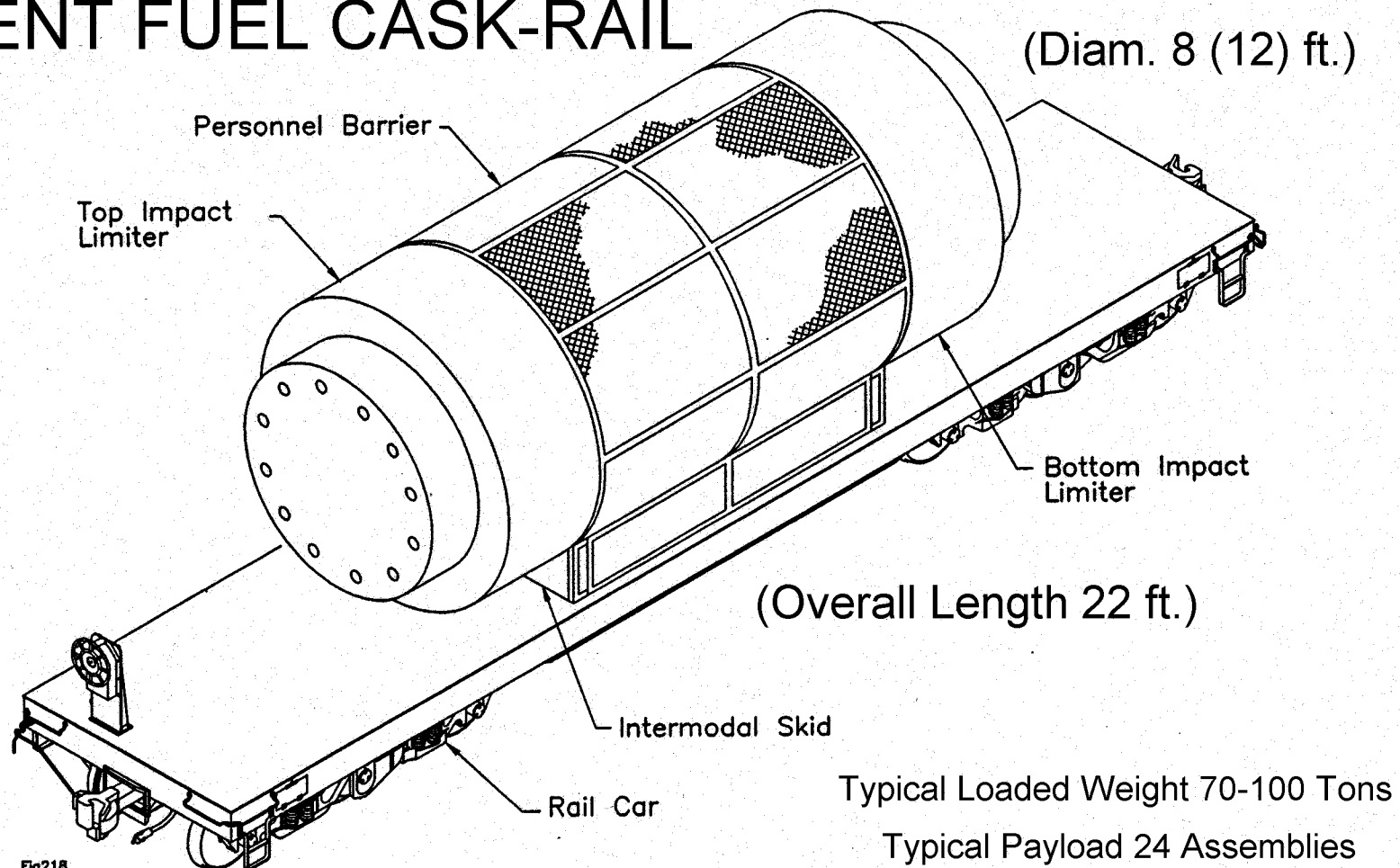
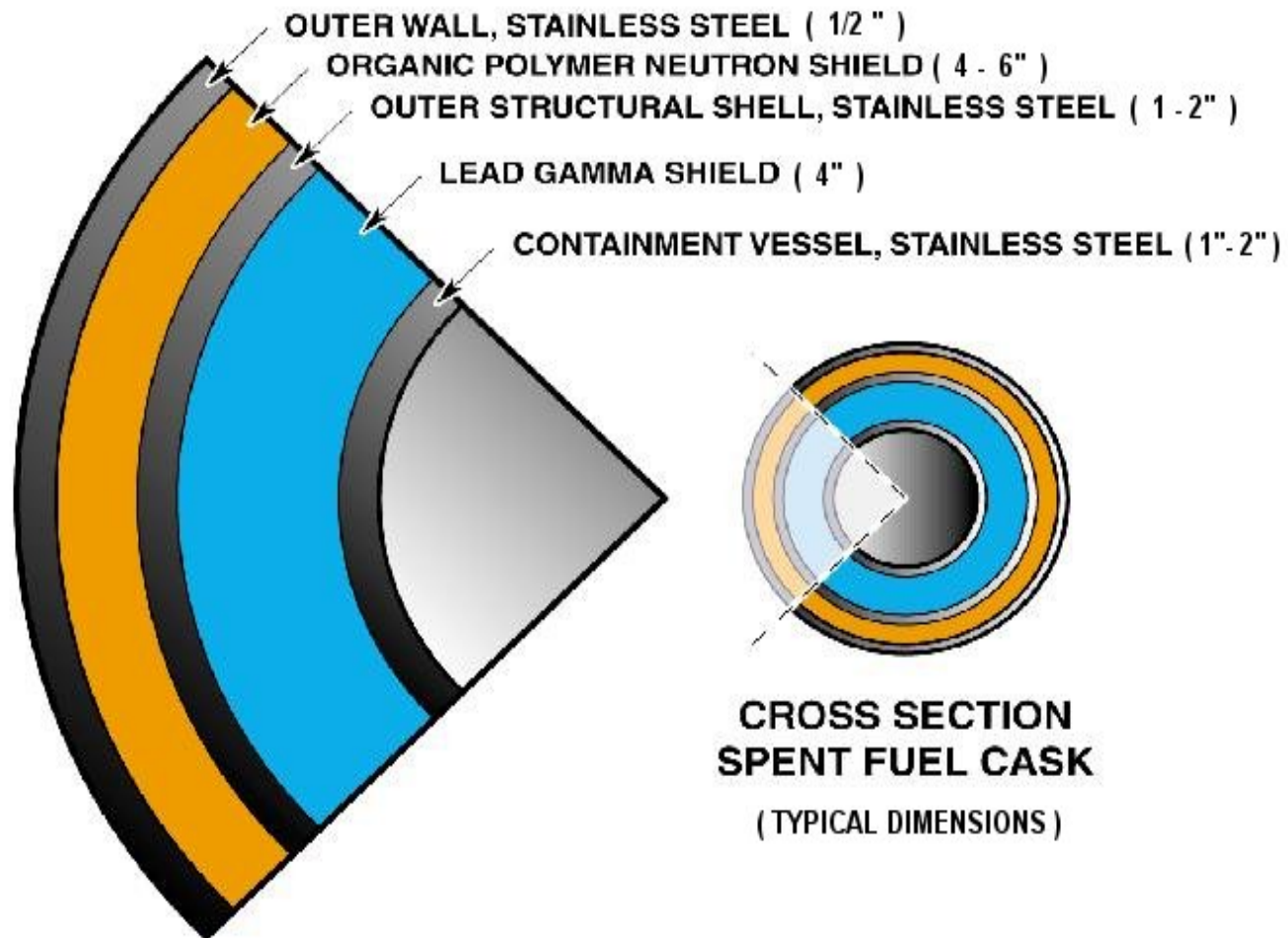


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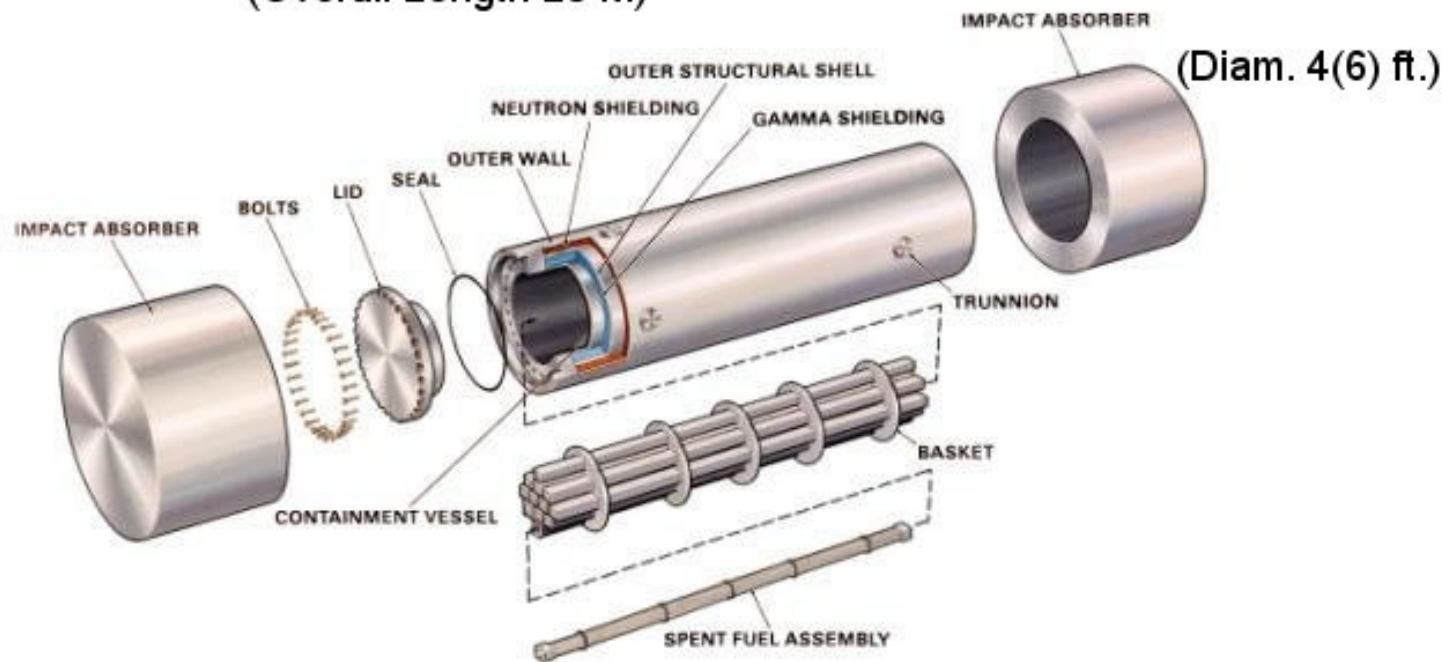


LAYERS OF PROTECTION



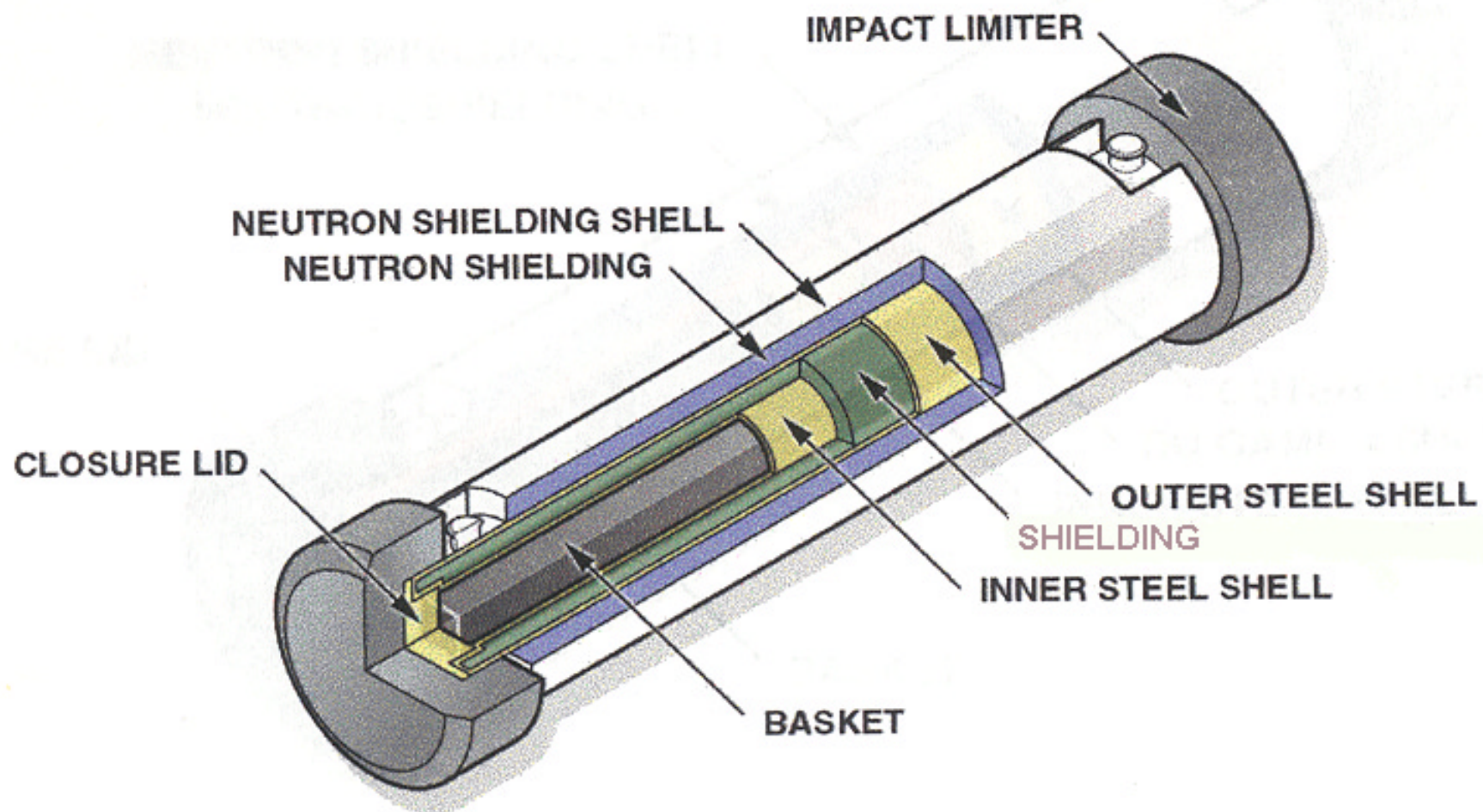
SPENT FUEL CASK-TRUCK

(Overall Length 20 ft.)



Typical Loaded Weight 50,000 #, Fuel 4,000 #

Payload 4-9 Fuel Assemblies



TRUCK CASK

Role of the U.S. Nuclear Regulatory Commission (NRC) (cont.)

- Set rules for protection against theft and sabotage
 - Prevention
 - Vigilance
 - Detection
 - Response
- Enforce NRC and DOT rules
 - Result from inspection findings
 - Violations -penalties ,termination,shutdown

NRC Rules Consider:

- **Routine transport conditions**
- **Cask safety in accident conditions**
- **Protection against theft or sabotage**

Conditions for Transport of Radioactive Material

■ A shipper must:

- Identify Materials and Activities
- Select Proper Packaging
- Verify Safe Radiation Levels

Shipper must have/use:

- **Approved routes and protection plan**
- **Markings, labels and shipping papers**
- **Proper and sufficient training**
- **Routine and emergency procedures**

Favorable History

- **About 1,300 spent fuel shipments over 20 years**
- **ZERO spent fuel package failures**
- **10,000 daily shipments of radioactive materials (all types)**

Transportation Studies

- NRC risk studies support regulations
- (3 completed, 1 in progress). Results show:
 - Routine shipments: cumulative exposure to public extremely low
 - Approved cask designs are robust under severe accident conditions

Package Performance Study

- **Severe impact and fire accidents**
- **Full scale testing being considered**
- **Re-validate codes/models and adequacy of regulations**

Package Performance Study (cont.)

- **Industry and international participation**
- **Public outreach**
- **Support for design and review efforts**

Planned Independent Studies

■ National Academy of Science

- Peer review of Package Performance Study
- Review of transportation risks

NRC Security Requirements for Fuel Shipments (10 CFR 73.37)

■ Objective:

- Protect shipments against sabotage and prevent theft of material
- Minimize possibility of radiological sabotage/theft

■ Means:

- Prevention
- Early detection and assessment
- Notification of response forces

Security Measures

- **Advanced Notification of States and NRC**
- **Physical protection plan**
- **Procedures and training**

Security Measures (cont.)

- NRC route and plan approval
- Escorts
- Surveillance, communication
- Routes not pre-announced to public

Security Measures (cont.)

- Safe havens
- Immobilization
- Coordination with State and Local law enforcement

NRC Actions Post 9/11 Re. Spent Fuel Transportation

- **Safeguards assessment team**
- **Issued advisories**
- **Interim compensatory measures**

Other Actions Post 9/11

- **Facilities remain in high security posture and continue normal operation**
- **NRC liaison with Off. Homeland Sec., other key federal agencies, and states**
- **NRC interaction with FAA re over flights**
- **NRC shut down and revised web site**

Long-Term NRC Actions

- Top to bottom examination of programs
- Vulnerability studies for cask designs
- Re-examination of balance between security and openness to public

Conclusion:

- Safe and secure transportation of spent fuel provided by:
 - Comprehensive regulations
 - Regulatory oversight and enhancements
 - Significant experience base & safety record
 - Robust cask designs